

## Appendix J

### Spatial and Temporal Considerations

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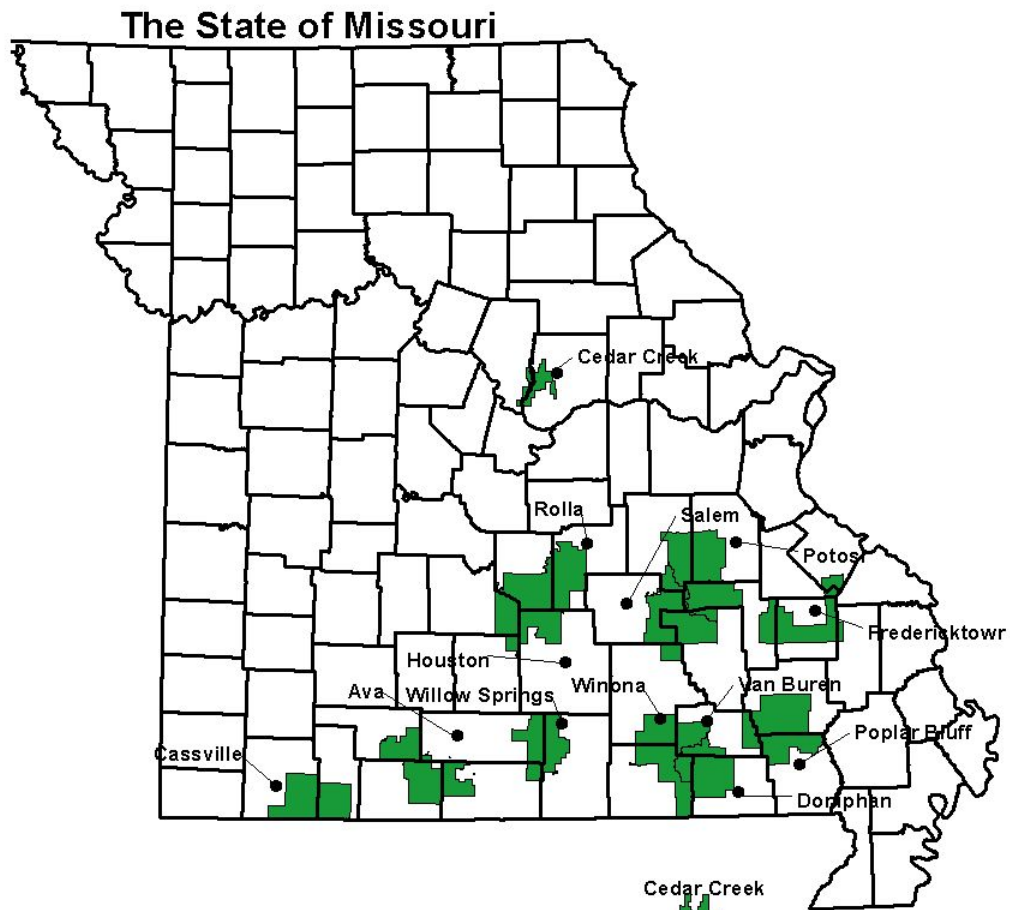
### Spatial and Temporal Considerations

Cumulative effects are defined as effects that, although taken separately may not be significant, may be significant when considered with the effects of past, present and reasonably foreseeable future actions. The cumulative effects would normally be in excess of a simple additive effect. For example, 10 harvest units in a watershed may produce 1 ton of sediment each. The simple additive effect would be 10 tons produced <sup>1/</sup>. If, however, the increased waterflow from the watershed doubles the sediment production with each new harvest unit cut, the first unit creates 1 ton, the second unit 2 tons, the third unit 4 tons, the fifth unit 8 tons and so on, the cumulative effect has almost equaled the sediment production of all ten units cut (additive), with only half the units harvested. If soil science and hydrology specialists tell the decision-maker that the sediment production must stay below 10 tons for the watershed to avoid a significant impact, then only 5 units may be cut. This would define the *intensity* of actions to be taken. Intensity would also be defined by whether these harvests were clearcuts versus commercial thinnings or the watershed was 100 acres, 1000 acres or 10,000 acres, for instance.

Actions must also be reviewed for the *context* in which they occur. It is the context that defines whether actions are appropriate and whether actions would or should be expected to have effects that are or are not significant. For instance, if the (now) five harvest units are identified as being on soils with fragipans (perched water tables) or contain highly erodible soils, the context (soils) on which harvests are to occur may require a “dry weather only” requirement. This would be identified in the appropriate NEPA document or those stands would be eliminated from harvest.

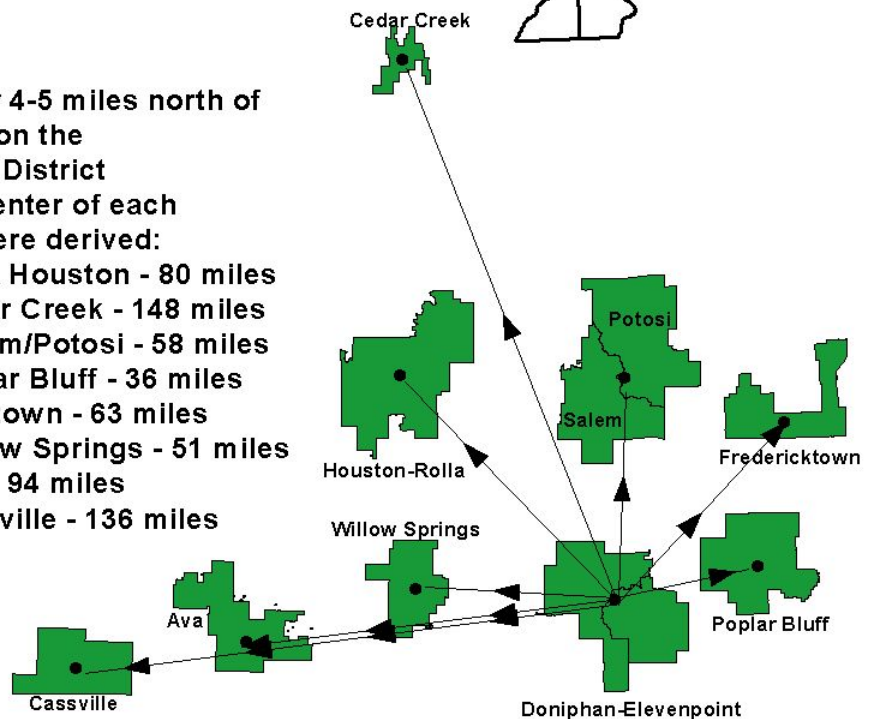
The Forest Plan also sets the context for where, when, and how actions will be taken. If the analysis of effect for the production of 8 tons of sediment is discussed in the context of the entire Missouri River drainage, this would be far beyond the scope of the project that may only occur in the Current River drainage. As in the case of the NE Corner Projects Area, actions analyzed may be well away from the Current River (in a smaller sub-drainage) such as Pike or Sycamore Creek. Similarly, if actions analyzed on the Doniphan/Eleven Point Ranger District (such as the NE Corner Projects Area) are compared to actions taken on another unit of the Mark Twain National Forest (for instance, the Salem Ranger District) this would also result in considerations beyond the scope of this site-specific project. Claiming that significant cumulative effects will occur would fail to consider the context of those actions on both districts in regard to the spatial and temporal relationship (context) of projects on the two units, as well as the intensity of actions within that large an area. The map on page 2 illustrates the relationship of the Doniphan/Eleven Point Ranger District to the rest of the Mark Twain National Forest districts.

1/ Values for tons of sediment shown above are for discussion purposes only and are not intended to represent actual values.



From a midpoint approximately 4-5 miles north of the Irish Wilderness boundary on the Doniphan/Eleven Point Ranger District to a point in the approximate center of each unit, the following distances were derived:

- Doniphan/Eleven Point to Rolla Houston - 80 miles
- Doniphan/Eleven Point to Cedar Creek - 148 miles
- Doniphan/Eleven Point to Salem/Potosi - 58 miles
- Doniphan/Eleven Point to Poplar Bluff - 36 miles
- Doniphan/Eleven Point to Fredtown - 63 miles
- Doniphan/Eleven Point to Willow Springs - 51 miles
- Doniphan/Eleven Point to Ava - 94 miles
- Doniphan/Eleven Point to Cassville - 136 miles



In consideration of the spatial (space or location) and temporal (time in years) relationship of past, present, and foreseeable future actions to and with the actions proposed and analyzed in this EA for the NE Corner Projects, the focus is on the management actions that manipulate forest vegetation <sup>1/</sup>. In the case of thinning, prescribed burning or the two actions in combination this manipulation may go all the way down to the grass and herbaceous layer. Regeneration cuts (whether even-aged or uneven-aged) manipulate the overstory (mature) forest. Intermediate treatments such as commercial thinnings, precommercial thinning, improvement cuts to increase the success of natural regeneration or improvement cuts to improve/prepare the stand for uneven-aged management are, as the name suggest, manipulations of the forest vegetation at some intermediate point in the time prior to regeneration. Salvage/sanitation and salvage address immediate forest stand needs. These needs, such as an overstocking of pole and small sawtimber size trees (commercial thinning), to improve a stand or forest condition that has occurred either from a single, catastrophic event (such as a tornado) or from environmental stresses (such as drought, disease, or insects) that have reduced a forest environment's natural defenses to a point that mortality is occur over what would normally be seen in a healthy system.

In these considerations the impact of roads needed for forest access, whether for management purposes or the public's use and enjoyment of the forest resources have been considered. The Mark Twain National Forest's Land and Resource Management Plan (Forest Plan) has considered and defined what is the Mark Twain's Forest Transportation System. The Forest Plan has directed that, when possible, non-system roads will be closed. The Mark Twain National Forest has completed the required Road Analysis Process or RAP (insert date completed) for the Service Level 3-5 system roads. Non-system roads and Service Level 1-2 roads are being address in project-specific RAPs, as was done for the NE Corner Projects Area ( See Appendix E). The impacts of actions to add to or enhance the condition of the roads needed for the NE Corner Projects has been considered and disclosed (See NE Corner EA, pages ?? - ??)

The consideration of past actions looked at projects that had occurred since 1990. This involved 39 compartments for projects implemented from 1990 to 2003. It was considered that for the purposes of this document projects that may have been implemented prior to 1990 were not crucial to fulfilling the purpose of this document. It was also considered that since the Forest Plan was signed in 1986, most project plans initiated under this plan would not have been implemented until 1990. The following tables contain those compartments, treatments, reasons for treatments, and the years they occurred. It was considered sufficient for the purposes of this document that the acknowledgement of past actions go only as far as the compartment and year the treatment occurred. The discussion to follow the tables will clarify this further.

1/ Descriptions of forest vegetation manipulation treatments have been generalized for uniformity in this document as terminology has changed and evolved over the years to address forest research findings and experienced-based observations that dictate minor changes in basic forest management methods to achieve desired results.

Compartment	Treatment	Year	Reason for Treatment
49	Group Selection	1994-1995	Group Openings (Uneven-aged Mgt.)
	Group Selection	1994 – 1995	Improvement Thinning Between Groups
	Seed Tree Seed Cut	1994	Even-aged Regeneration
	Shelterwood Seed Cut	1994	Even-aged Regeneration
21	Clearcuts	1989	Even-aged Regeneration
	Clearcuts (5)	1993-1994	Even-aged Regeneration
22	Clearcuts	1990, 1995	Even-aged Regeneration
	Seed Tree Seed Cut	1994	Even-aged Regeneration
	Shelterwood Seed Cut	1995	Even-aged Regeneration
23	Clearcut	1993	Even-aged Regeneration
	Precommercial Thinning	1991	Timber Stand Improvement
45	Salvage/Sanitation	1994	Stand Health Improvement
	Precommercial Thinning	1997	Timber Stand Improvement
	Seed Tree Seed Cut	1994	Even-aged Regeneration
	Shelterwood Seed Cut	1994	Even-aged Regeneration
149	Improvement Cut	1998	Beginning Cut in Uneven-aged Mgt.
	Improvement Cut	1993 & 1997	Beginning Cut in Uneven-aged Mgt.
150	Improvement Cut	1996 & 1997	Beginning Cut in Uneven-aged Mgt.
	Improvement Cut	1994-1997	Beginning Cut in Uneven-aged Mgt.
	Prescribed Burning	1998 & 2000	Habitat Improvement
	Clearcut	1995	Even-aged Regeneration
151	Improvement Cut	1996-1999	Beginning Cut in Uneven-aged Mgt.
	Precommercial Thinning	1997	Timber Stand Improvement
	Prescribed Burning	1998 – 2001,	Habitat Improvement
152	Improvement Cut	1997 & 1998	Beginning Cut in Uneven-aged Mgt.
	Improvement Cut	1997 – 98, 01	Beginning Cut in Uneven-aged Mgt.
	Precommercial Thinning	1996	Timber Stand Improvement
153	Commercial Thinning	1993, 1995	Improve Growth
	Prescribed Burning	1993 - 2002	Habitat Improvement
	Site Preparation	1993, 1995	To Encourage Natural Regeneration
159	Improvement Cut	1997 & 1998	Beginning Cut in Uneven-aged Mgt.
	Improvement Cut	1998 – 99, 00	Beginning Cut in Uneven-aged Mgt.
	Salvage of Mortality	1996 & 1997	Stand Health Improvement
	Prescribed Burning	1992 & 1997	Habitat Improvement
62	Salvage/Sanitation	1995 & 1997	Stand Health Improvement
	Precommercial Thinning	1997	Timber Stand Improvement
	Shelterwood Prep Cuts	1997	Prior to Even-aged Regeneration
	Seed Tree Seed Cut	1995	Even-aged Regeneration
	Shelterwood Seed Cut	1996	Even-aged Regeneration
35	Salvage/Sanitation	1995-1999	Stand Health Improvement
	Precommercial Thinning	1997-1999	Timber Stand Improvement
	Shelterwood Seed Cut	1995 - 97	Even-aged Regeneration
	Clearcut	1990	Even-aged Regeneration
	Group Selection	1998 & 1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1998 & 1999	Improvement Thinning Between Groups
19	Precommercial Thinning	1997	Timber Stand Improvement
	Group Selection	1994, 96, 97	Group Openings (Uneven-aged Mgt.)
	Group Selection	1994, 96, 97	Improvement Thinning Between Groups
	Shelterwood Seed Cut	1994	Even-aged Regeneration
	Prescribed Burning	1992	Habitat Improvement
32	Salvage/Sanitation	1996 & 1997	Stand Health Improvement
	Group Selection	1996 & 1997	Group Openings (Uneven-aged Mgt.)

Compartment	Treatment	Year	Reason for Treatment
	Group Selection	1996 & 1997	Improvement Thinning Between Groups
	Clearcut	1997	Even-aged Regeneration
	Improvement Cut	1996 & 1997	Beginning Cut in Uneven-aged Mgt.
	Prescribed Burning	1992 & 1999	Habitat Improvement
33	Salvage/Sanitation	1998	Stand Health Improvement
	Prescribed Burning	1992 & 1993	Habitat Improvement
	Clearcut	1998	Even-aged Regeneration
	Shelterwood	1994	Even-aged Regeneration
	Improvement Cut	1998	Beginning Cut in Uneven-aged Mgt.
46	Group Selection	1997 & 1998	Group Openings (Uneven-aged Mgt.)
	Commercial Thinning	1997 & 1998	Improve Growth
	Precommercial Thinning	1997 & 1998	Timber Stand Improvement
	Group Selection	1996 - 98	Group Openings (Uneven-aged Mgt.)
	Group Selection	1996 – 98	Improvement Thinning Between Groups
	Prescribed Burning	1992	Habitat Improvement
	Shelterwood Seed Cut	1997 & 1998	Even-aged Regeneration
	Salvage/Sanitation	1998	Stand Health Improvement
48	Group Selection	1996 & 1997	Group Openings (Uneven-aged Mgt.)
	Group Selection	1996 & 1997	Improvement Thinning Between Groups
	Shelterwood Seed Cut	1996 & 1997	Even-aged Regeneration
58	Commercial Thinning	1997 & 1998	Improve Growth
	Prescribed Burning	1999	Habitat Improvement
11	Shelterwood Seed Cut	1997 & 1998	Even-aged Regeneration
	Clearcut	1989 & 1990	Even-aged Regeneration
	Group Selection	1997 & 1998	Group Openings (Uneven-aged Mgt.)
	Group Selection	1997 & 1998	Improvement Thinning Between Groups
	Salvage/Sanitation	1998	Stand Health Improvement
	Precommercial Thinning	1997	Timber Stand Improvement
14	Commercial Thinning	1997, 1998	Improve Growth
	Precommercial Thinning	1997	Timber Stand Improvement
	Salvage/Sanitation	1997	Stand Health Improvement
	Shelterwood	1997, 1998	Seed Cut (Even-aged Regeneration)
	Group Selection	1997, 1998	Group Openings (Uneven-aged Mgt.)
	Group Selection	1997, 1998	Improvement Thinning Between Groups
	Improvement Cut	1998,	Beginning Cut in Uneven-aged Mgt.
17	Salvage/Sanitation	1996 – 1999	Stand Health Improvement
	Shelterwood	1998	Even-aged Regeneration
	Precommercial Thinning	1994	Timber Stand Improvement
	Site Preparation	2000	To Encourage Natural Regeneration
	Group Selection	1998	Improvement Thinning Between Groups
	Prescribed Burning	1994	Habitat Improvement
18	Salvage/Sanitation	1999 – 2001	Stand Health Improvement
	Shelterwood Seed Cut	1999, 2001	Even-aged Regeneration
	Commercial Thinning	1999, 2001	Improvement Cut
	Prescribed Burning	1992, 1993	Habitat Improvement
	Precommercial Thinning	1999	Timber Stand Improvement
	Site Preparation	2001, 2002	To Encourage Natural Regeneration
101	Precommercial Thinning	1998	Timber Stand Improvement
	Commercial Thinning	1998	Improve Growth
	Shelterwood Seed Cut	1998	Even-aged Regeneration
	Site Preparation	2001, 2002	To Encourage Natural Regeneration
	Salvage/Sanitation	1998	Stand Health Improvement

Compartment	Treatment	Year	Reason for Treatment
102	Salvage/Sanitation	1999	Stand Health Improvement
	Precommercial Thinning	1998	Timber Stand Improvement
	Commercial Thinning	1999, 2000	Improve Growth
	Shelterwood Seed Cut	1999	Even-aged Regeneration
72	Commercial Thinning	1994	Improve Growth
	Commercial Thinning	1999, 2000	Improve Growth
	Group Selection	1998, 1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1998, 1999	Improvement Thinning Between Groups
	Prescribed Burning	1992	Habitat Improvement
	Shelterwood Seed Cut	1999	Even-aged Regeneration
73	Prescribed Burning	1994, 1998	Habitat Improvement
	Commercial Thinning	1999	Improve Growth
	Precommercial Thinning	1990	Timber Stand Improvement
	Salvage/Sanitation	1999	Stand Health Improvement
	Group Selection	1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1999	Improvement Thinning Between Groups
	Clearcut	1987	Even-aged Regeneration
	Commercial Thinning	1999	Improve Growth
75	Precommercial Thinning	1990, 1999	Timber Stand Improvement
	Group Selection	1997	Group Openings (Uneven-aged Mgt.)
	Group Selection	1997	Improvement Thinning Between Groups
	Prescribed Burning	1991	Habitat Improvement
	Commercial Thinning	1998, 1999	Improve Growth
	Group Selection	1999	Group Openings (Uneven-aged Mgt.)
288	Group Selection	1999	Improvement Thinning Between Groups
	Prescribed Burning	1990, 1993	Habitat Improvement
	Shelterwood Seed Cut	1997	Even-aged Regeneration
	Commercial Thinning	1999, 2000	Improve Growth
	Group Selection	1998, 1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1998, 1999	Improvement Thinning Between Groups
300	Precommercial Thinning	1998	Timber Stand Improvement
	Clearcut	1999	Even-aged Regeneration
	Seed Tree Seed Cut	1998, 1999	Even-aged Regeneration
	Commercial Thinning	1998, 1999	Improve Growth
	Group Selection	1998, 1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1998, 1999	Improvement Thinning Between Groups
	Shelterwood Seed Cut	1999	Even-aged Regeneration
	Seed Tree Seed Cut	1999	Even-aged Regeneration
59	Prescribed Burning	1994, 1999	Habitat Improvement
	Prescribed Burning	2000	Habitat Improvement
	Salvage/Sanitation	1994, 1999	Stand Health Improvement
	Commercial Thinning	1991, 1999	Improve Growth
	Group Selection	1999	Group Openings (Uneven-aged Mgt.)
	Group Selection	1999	Improvement Thinning Between Groups
	Prescribed Burning	1995	Habitat Improvement
	Clearcut	1990	Even-aged Regeneration
260	Commercial Thinning	1991, 2000	Improve Growth
	Group Selection	2000	Group Openings (Uneven-aged Mgt.)
	Group Selection	2000	Improvement Thinning Between Groups
	Shelterwood Seed Cut	2000	Even-aged Regeneration
261	Commercial Thinning	1993,1999-02	Improve Growth
	Group Selection	1999, 2000	Group Openings (Uneven-aged Mgt.)





The following discussions separates out, by treatment, those compartments in which treatments occurred. The factors that were considered to determine whether or not these past actions have relevance for cumulative effects to those actions proposed and analyzed in the NE Corner Projects EA are identified.

## **Past Management Actions**

### Even-aged Regeneration Cuts

*Clearcuts:* This intensive regeneration method was used in 11 of the 39 compartments considered. Most cuts occurred prior to 1995 with Compartment 300 being the only cut more recent (1999). Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be well beyond the latest expected measurable effects of clearcuts in Compartment 300. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) separation of treatments.

*Seed Tree Seed Cuts:* This intensive regeneration method was used in 8 of the 39 compartments considered. Five compartments had cuts occur prior to 1995. Compartments 300, 59, 261 were more recent (1999 & 2001). Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be well beyond the latest expected measurable effects of seed tree seed cuts in the compartments with seed tree regeneration cuts prior to 1995. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) separation of treatments. Compartment 59 is approximately 20 miles separated from the southern most edge of The NE Corner Projects Area. An initial look at Compartment 261 shows that it shares a common boundary with a portion of Compartment 281 in NE Corner. Compartment 281 does have 11 acres proposed for clearcut. These 11 acres are, however, isolated from the rest of the stand by private land. The actions in that part of Compartment 281 that are adjacent to Compartment 261 are 15 acres of Commercial Thinning that leaves a residual cover of trees. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Compartment 281 (or elsewhere) will not have cumulative effects with past management in Compartment 261, as well as others considered here.

*Shelterwood Seed Cut:* This somewhat less intensive regeneration method (compared to seed tree and clearcuts) was used in 22 of the 39 compartments considered. Compartments 49, 22, 45, 62, 35, 19, 33 had cuts occur from 1994 - 1996. Compartments 59, 63, 65, 67, 11, 14, 46, 48, 17, 18, 101, 102, 72 were more recent (1997 to 2002). Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be well beyond the latest expected measurable effects of shelterwood seed cuts in the compartments with shelterwood seed tree regeneration cuts prior to 1996. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) separation of treatments.

Compartments 59, 63, 65, 67, 11, 14, 46, 48, 17, 18, 101, 102, 72, although more recent (1997 to 2002), average in distance from the NE Corner Project Area approximately 25 miles (See map on page ??). An initial look at Compartment 260 shows that it shares a common boundary (though minimal) with a portion of Compartment 281 in NE Corner. The actions in that part of Compartment 281 that are anywhere near Compartment 260 are 15 acres of commercial thinning that leaves a residual cover of trees. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Compartment 281 (or elsewhere) will not have cumulative effects with past management in Compartment 260, as well as others considered here.

### Uneven-aged Management and Related Actions

*Group Selection:* There are generally two actions that occur in the application of group selection. There is the creation of small openings that are the result of removing groups of mature trees that “release to grow” young trees (normally of the type being removed). The second action that occurs later normally is a thinning of the intact stand that remains between openings to remove damaged, diseased, or low quality trees. Experience has shown that group openings normally take up, on average, about 7% of the treated stand (for example, in 100 acres, approximately 7 acres of openings would be created exist). The remaining 93 acres would receive the thinning.

In past management actions, 21 compartments contained group selection out of the 39 compartments considered. The majority of these 21 compartments (16) that have group selection cuts occur from 2001 (Compartment 70), from 2000 (Compartments 65, 70, 102) and the remaining 13 compartments (Compartments 59, 49, 35, 19, 32, 46, 48, 11, 14, 17, 72, 73, 75) prior to 1999. The average distance from the NE Corner Projects Area for these group selections in these 16 compartments are 25 miles. The closest being C102 in 2000 at approximately 20 miles. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past management in the previously identified 16 compartments.

Compartments 288, 300, 239, and 261 all had group selection implemented since 1999. Compartments 288, 300 (part of Management Area 4.1-12) and Compartment 261 border the NE Corner Project Area. Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be well beyond the latest expected measurable effects of group selection in the compartments with group selection cuts prior to 1999. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) separation of treatments. Compartment 260’s group selection was implemented in 2000. This compartment has only a minimal amount of boundary common with Compartment 281 of the NE Corner Project. Given the closest proposed action in Compartment 281 is a commercial thinning (15 acres) and the time separation of the group selection in Compartment 260, actions in the NE Corner Project Area will not have cumulative effects with past management Compartment 260.

### Intermediate Management Actions

*Commercial Thinning:* Commercial thinning is generally done to reduce the number of stems per acre so that remaining stems have increased room to grow to a large diameter. The word “commercial” in this context means that trees are of a size (length and diameter) that meet the timber products industry’s needs for raw logs to saw, chip, or otherwise manufacture into products that the public wants to buy. Thinning also reduces competition for nutrients and water amongst trees and can increase forest floor vegetation that can contribute to an increase in suitable habitat for a greater diversity of wildlife.

Commercial thinning has occurred in 19 of the 39 compartments considered for past management actions. Compartment 261 had commercial thinning occur from 1999 through 2002, with Compartment 260 having commercial thinning in 2000 and 2002. Compartments 288 and 300 (that complete Management Area 4.1-12) had commercial thinning as late as 1999 and 2000, respectively. Compartment 261 shares a portion of a border with Compartment 281 of the NE Corner Project Area. Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be beyond the latest expected measurable effects of commercial thinning in the compartments (261, 288, and 300) with commercial thinning prior to 2002. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) separation of treatments. Compartment 260’s latest commercial thinning was implemented in 2002. This compartment has only a minimal amount of boundary common with Compartment 281 of the NE Corner Project. Given the closest proposed action in Compartment 281 being a commercial thinning (15 acres) and the time separation of the group selection in Compartment 260, actions in the NE Corner Project Area will not have cumulative effects with past management in Compartment 260.

Fifteen compartments of the 19 compartments have commercial thinning occur from 2001 (Compartment 63), from 2000 (Compartments 18, 66, 67, 70, 72, 102) and the remaining 8 compartments (Compartments 14, 59, 58, 73, 75, 101, 153, and 239) prior to 1999. The average distance from the NE Corner Projects Area for commercial thinning in these 8 compartments are 25 miles. The closest being Compartment 102 (2000) is the closest at approximately 20 miles. Compartment 239 (1999) is an exception, being less than 5 miles from Compartment 281. The majority of the NE Corner Projects Area is greater than 5 miles away from commercial thinning actions in Compartment 239. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past management in the previously identified 15 compartments.

*Precommercial Thinning:* Precommercial thinning is generally done to reduce the number of stems per acre so that remaining stems have increased room to grow to a large diameter. The word “precommercial” in this context means that trees are too small (length and diameter) to meet the timber products industry’s needs for raw logs to saw, chip, or otherwise manufacture into products that the public wants to buy. This type of thinning is done to benefit young trees that will compose the new stand after harvest by also reducing competition for nutrients and water amongst trees. This type of thinning will also be applied to release commercial tree species from competition from noncommercial species. This can also increase forest floor vegetation that can contribute to an increase in suitable habitat for a greater diversity of wildlife.

Twenty-one compartments had precommercial thinning implemented from as late as 2003 (Compartment 151), 2002 (Compartment 65), 2001 (Compartment 70) and 2000 (Compartment 66) to pre-1999 projects (going back to 1994) in Compartment 18, 75, 300, 46, 101, 102, 45, 14, 11, 19, 62, 152, and 17. The average distance from the NE Corner Projects Area for precommercial thinning in these 21 compartments, except for Compartments 151, 152, and 300, is 25 miles. The closest being Compartment 102 (2000) at approximately 20 miles. Compartment 239 (1999) is an exception, being less than 5 miles from Compartment 281. The majority of the NE Corner Projects Area is greater than 5 miles away from precommercial thinning actions in Compartment 239. Compartment 239 treatments also impact a different creek (Little Pike Creek) drainage than NE Corner Projects treatments (Pike Creek). Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past management in the previously identified 14 pre-1999 compartment precommercial treatments.

Precommercial treatments in Compartments 65, 70 and 66, although occurring as recently as 2002, 2001 and 2000 respectively, are removed from a consideration for cumulative effects with the NE Corner Projects Area by some 30 miles. Impacts from precommercial thinning in Compartment 151 (occurring in 2003) are some 8 miles removed from the NE Corner Projects Area and, like Compartment 239, also impact a different creek (Little Pike Creek) drainage than NE Corner Projects treatments (Pike Creek). Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past management in Compartment 151.

*Prescribed Burning:* Prescribed (controlled) burning is done under predetermined (prescribed conditions) of weather, fuels, and location to result in a controlled situation in which to ignite forest fuels to develop a grass/forb ground cover, create more open canopy conditions (preceded by a thinning) to produce woodland habitat, or to control woody species composition in the understory. Prescribed burning, combined with thinning and control of woody species composition in the understory can create forest stand conditions that are conducive to stand use by early seral wildlife specialists. Prescribed burning is generally applied to create or improve wildlife habitat. Recently, prescribed burning has also been used to reduce the risk of property loss and to the public and firefighters in areas of the forest where private land intermingles with national forest.

Twenty compartments of the 39 compartments had prescribed burning implemented from as late as 2003 (Compartment 151) and 2000 (Compartment 59, 150, 153) to 1999 and earlier projects (going back to 1990) in Compartment 288, 239, 261, 63, 65, 159, 19, 32, 33, 46, 58, 17, 18, 72, 73, and 75. The average distance from the NE Corner Projects Area for prescribed burning in 10 of these 21 compartments (Compartments 63, 65, 19, 32, 33, 46, 58, 17, 18, 72, 73, and 75) is 25 miles. The closest being Compartment 19 (1992) at approximately 23 miles. Based on the physical distance of past prescribed burning, both in distance and time, the 10 compartments listed above were not considered for cumulative effects with the NE Corner Projects Area actions. Compartments 239 (1995) and 288 (1993) are within 5 miles of the NE Corner Projects Area but are removed in time from consideration for cumulative effects. Generally, prescribed burning effects on air quality last only 24 hours with other factors (such as traffic control) lasting for the duration of the actual burn. The blackened ground lasts till the next growing season (<1 year). Compartment 159 (1997) is beyond 10 miles from the NE Corner Projects Area so falls out of consideration for cumulative effects both on time and distance considerations. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past prescribed burning in Compartment 239, 288, and 159. Prescribed burning in Compartments 151, 59, 150, and 153 have all occurred since 2000 but all compartments, except 59, average 10 miles from the NE Corner Projects Area. Compartment 59 lies 25 miles from the NE Corner Projects Area. Prescribed burning in Compartments 151, 59, 150, and 153 have also impacted a different creek (Little Pike Creek) drainage than NE Corner Projects treatments (Pike Creek). Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be beyond the latest expected measurable effects of prescribed burning in Compartments 151, 59, 150, and. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) and spatial (distance) separation of treatments.

*Salvage/Sanitation:* A commercial cut to remove dead or dying trees (predominantly black and scarlet oak) from a stand. The intent is to harvest these trees before decay makes the wood unusable. Some openings may occur. Generally a residual stand remains with increased growing space between trees. The appearance of the stand is also improved.

Fifteen of the 39 compartments implemented salvage/sanitation treatments. All 15 compartments had salvage/sanitation treatments implemented earlier than 2001. The majority occurred prior to the period 1997 – 1999. All compartments, except Compartment 159, are located from approximately 20 to 30 miles (or more) distance from the NE Corner Projects Area. Compartment 159 sits at 10+ miles distance from NE Corner. Based on the intensity of actions considered and the additional considerations of time and space, actions in the NE Corner Project Area will not have cumulative effects with past salvage/sanitation treatments in the 15 compartments identified here.

### Preparation/Improvement Cuts

*Improvement Cuts for Uneven-aged Management:* A commercial intermediate cut to develop or improve uneven-age structure (numbers of trees of different sizes/ages) and/or the species composition of a stand. Cutting will generally focus on the removal of high-risk (trees not expected to live for the next ten years) black and scarlet oak, and the occasional removal of other species. Non-commercial cutting of smaller trees in certain diameter classes may be applied following harvesting to further develop or improve stand structure.

Nine of the 39 compartments implemented improvement cuts prior to implementing uneven-aged management (UEAM). The latest implemented improvement cuts for UEAM was Compartment 152 (2001) and Compartment 159 (2000). These two compartments are located 10+ miles from the NE Corner Projects Area. Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be beyond the latest expected measurable effects of improvement cuts for UEAM in Compartments 152 and 159. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) and spatial (distance) separation of treatments. The remaining compartments containing improvement cuts have also been removed from consideration for cumulative effects due to temporal (time) separation from the NE Corner Projects Area, or are located 10 to 30 miles distance from the NE Corner Projects Area.

*Site Preparation for Natural Regeneration:* This treatment involves cutting of all stems over 6 feet tall except designated den trees, potential den trees, snags, seed trees, some flowering species (e.g. dogwood), and some fruiting species for wildlife, to encourage reproduction by stump sprouting. This technique would be applied following clearcutting, seed tree cutting, shelterwood seed cutting and in uneven-management group openings.

Only three compartments of the 39 considered in this appendix had site preparation for natural regeneration. Two of the compartments (17 and 18) are 25 to 30 miles distance from the NE Corner Projects Area. The years were 2000 and 2002, respectively. Given the physical time delay from proposed action, to analysis, to decision, resolution of appeals and/or litigation (if any), implementation of NE Corner treatments would be beyond the latest expected measurable effects of site preparation for natural regeneration in Compartments 17 and 18. There are no cumulative effects with actions in the NE Corner Projects based on the temporal (time) and spatial (distance) separation of treatments. The remaining compartment (153) has also been removed from consideration for cumulative effects due to temporal (time) separation from the NE Corner Projects (implemented in 1995).

**Note: The map on the following page (page J15) shows the compartments within 15 miles of the NE Corner Projects Area. A more extensive map is contained in the project file and the map on page J15 is intended as an example of , but not an exhaustive representation, of information used in the previous pages.**

